



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Montana

Forestry Best Management Practices Improve Water Quality

Waterbodies Improved

Historic forestry activities impaired Lower Piper Creek and Upper and Lower Goat Creek, prompting Montana to add these three segments to its 1996 Clean Water Act section 303(d) list of impaired waters. Landowners collaborated with federal and state agencies to implement forestry best management practices (BMPs) in Goat and Piper creeks. Water quality improved, and in 2006 Montana removed Upper Goat Creek from the 303(d) list for nutrients and Lower Piper Creek and Lower Goat Creek for siltation.

Problem

Piper and Goat creeks empty into the Swan River in northwestern Montana (Figure 1). Timber production is an important economic resource and a key source of sediment pollution in the Swan River watershed. Most of the land is owned and managed by the U.S. Forest Service, the Swan River State Forest and Plum Creek Timber Company (PCTC). Timber activities that generated sediment and nutrient pollution included building forest roads, harvesting timber from riparian areas, disturbing forest ground, and removing trees and canopy cover. Private developers contributed additional pollution by disturbing riparian areas, encroaching on streams, building septic systems and not adequately maintaining private roads.

Montana Department of Environmental Quality (MDEQ) added Piper Creek and the entire length of Goat Creek to its 1996 303(d) list for partial support of aquatic life and cold-water fish. During 2002 revisions to the 303(d) list, MDEQ refined the causes of impairment to specify that nutrients and suspended solids impaired a 9-mile segment of Upper Goat Creek and that siltation impaired both a 1-mile segment of Lower Goat Creek and a 4-mile segment of Piper Creek.

In Upper Goat Creek, MDEQ indicated that total suspended sediment and nutrient concentrations exceeded the state standard, which requires "no increases in these pollutants are allowed above naturally occurring concentrations that will render the waters harmful or create a nuisance for its classified uses." The Goat Creek TMDL established a total suspended solids (TSS) target of 30 milligrams per liter (mg/L). This target was based on reference streams in the Swan Lake

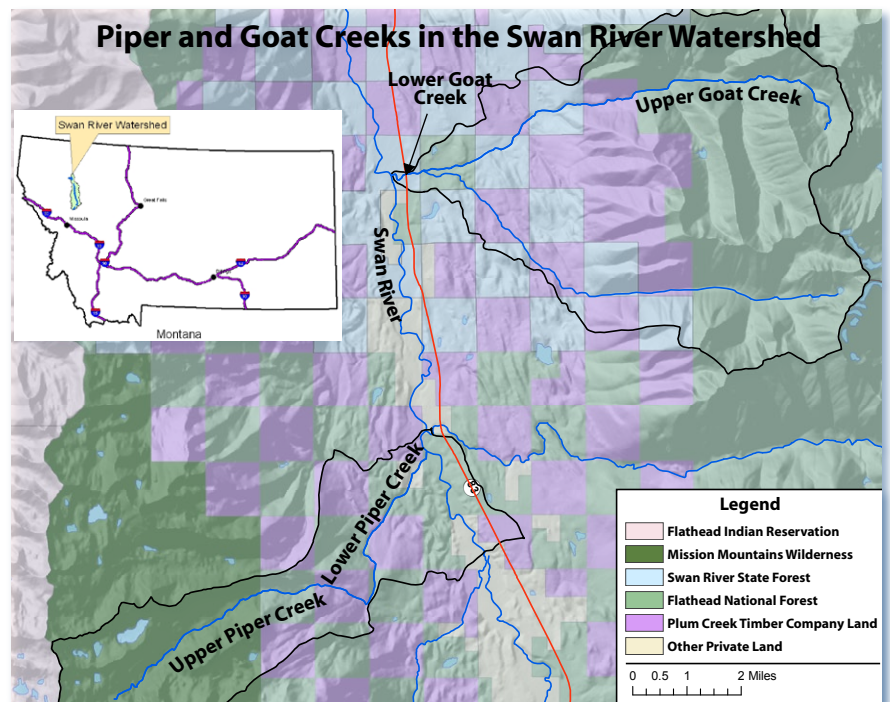


Figure 1. Map of the Piper Creek and Goat Creek watersheds.

drainage area, which have peak flow TSS values in the 15 to 20 mg/L range, indicating a range of naturally occurring conditions.

Increased erosion caused nutrient concentrations to rise as well. MDEQ analyzed nutrient data from various sources, which indicated that Upper Goat Creek nitrate levels ranged from 0.06 to 0.10 mg/L, and that nitrite + nitrate levels were around 0.07 mg/L. Both estimates exceeded background levels.

In 1989 MDEQ assessed Lower Goat Creek and found elevated levels of sediment deposition that contributed to an embedded substrate and braiding of the stream channel. This segment of Goat Creek was impaired by excess siltation, particularly near the mouth, because of logging road runoff that caused banks to

rapidly erode. In Piper Creek, the MDEQ stream reach assessment showed that fine sediment in the channel—mainly from timber harvest and roads—moderately impaired the creek. MDEQ found that 53 percent of the stream reach had a less-than-healthy riparian plant community because of timber harvest.

Project Highlights

Water quality improvement efforts have been underway for the past 20 years. In 1989 Montana adopted forestry BMPs. In 1991 the state enacted a Streamside Management Zone law, which limits the removal of riparian vegetation for commercial timber harvest and the use of potentially harmful timber harvest practices near waterbodies.

Swan River and several of its tributaries provide significant habitat for bull trout, a federally listed threatened species. In 1997 PCTC met with the U.S. Fish and Wildlife Service to begin developing the Native Fish Habitat Conservation Plan. Under this plan, PCTC agreed to upgrade old roads for which it has direct or shared responsibility to an improved erosion control standard by the end of 2015.

In 2004 MDEQ completed a Water Quality Plan and Total Maximum Daily Loads (TMDLs) for the Swan Lake Watershed. A key element of the plan is to reduce excess sediment delivery to streams from roads throughout the Swan Lake Watershed. PCTC installed BMPs on existing roads in the Goat and Piper Creek watersheds, including relief culverts and drivable drain dips that redirect sediment carried in snowmelt



Figure 2. Roadside catchments capture sediment from runoff and allow water to infiltrate and sediment to settle out.

or runoff from the road to infiltration areas on adjacent slopes. In addition, PCTC designed and constructed new roads with enhanced BMPs that exceed existing state rules and current BMP standards.

The U.S. Forest Service added roadside drainage catchments that accumulate runoff and sediment on public lands (Figure 2). The Montana Department

of Natural Resources and Conservation (MDNRC) constructed road BMPs and implemented a no-harvest buffer zone along a portion of Goat Creek on Swan Lake State Forest lands. MDNRC also completed other drainage work in a major tributary to Goat Creek.

Results

This multifaceted approach has successfully decreased concentrations of suspended solids and nutrients in Goat and Piper creeks over time. In fact, when MDEQ assessed water quality as part of the 2004 TMDL, the data indicated that Goat and Piper creeks met water quality standards for TSS and nutrients. The impairment indicators seen in earlier MDEQ stream assessments were no longer obvious. Therefore, although sediment and stream channel conditions might not be pristine, MDEQ believes that they are within the range of naturally occurring and should no longer be considered impaired. Moreover, the periphyton results do not raise sediment or habitat concerns.

PCTC performed additional water quality assessments and estimated that road improvement efforts have led to a 29 percent and 71 percent decrease in sediment delivered to Goat and Piper creeks, respectively, helping the streams meet the TMDL TSS target of 30 mg/L. As a result, in 2006 MDEQ removed Lower Piper and Lower Goat Creeks from the state's 303(d) list for siltation and Upper Goat Creek for nutrients.

Partners and Funding

Approximately \$409,000 in EPA section 319 grants supported the Swan Ecosystem Center. The center coordinated the Swan Watershed Group and Technical Advisory Group, which helped to develop the Swan Lake Watershed TMDL. Organizations that helped to restore and monitor water quality include MDEQ, MDNRC; Flathead Basin Commission; Flathead Biological Station, University of Montana; Flathead National Forest; Friends of the Wild Swan; Lake County; Missoula County; Montana Fish, Wildlife and Parks; PCTC; Swan Ecosystem Center; The Trust for Public Land and others. The U.S. Forest Service, MDNRC, and PCTC have funded their own restoration projects in Goat and Piper creeks.



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